WHAT IS CLAIMED IS:

1. A displacement detection apparatus comprising:

a light beam illuminating system for converting a linearly polarized light beam emitted from a light emitting element into a substantially parallel light beam and irradiating a relatively moving object with the light beam through a light beam splitting optical system, said light beam splitting optical system splitting the single parallel light beam emerging from said light beam illuminating system into a plurality of polarized light beams whose polarized states are different from each other;

a focusing optical system for focusing the plurality of split light beams to different positions on a surface of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

comparator for comparing light receiving signal levels of the respective light beams to detect a relative displacement of the relatively moving object.

2. An apparatus according to claim 1, wherein said light beam splitting optical system has an optical performance capable of splitting the light beam emerging from said light emitting element and, at positions where the light beams are focused by said focusing optical system, spatially separating the focusing positions of the focused light beams.

3. An apparatus according to claim 2, wherein the surface of the relatively moving object is substantially vertically irradiated with the plurality of focused light beams.

4. An apparatus according to claim 1, wherein a slit-shaped marking or a three-dimensional marking is formed on the surface of the relatively moving object to generate a reflectance difference.

5. An apparatus according to claim 4, wherein said light beam splitting optical system has an optical characteristic with which the focusing positions of the plurality of focused light beams are spatially separated at an interval almost equal to a width of the marking.

6. An apparatus according to claim 1, wherein said light beam splitting optical system has a parallel

plate shape.

7. A displacement detection apparatus comprising:

a light beam illuminating system for converting a linearly polarized light beam emitted from a light emitting element into a substantially parallel light beam and irradiating a relatively moving object with the light beam through a light beam splitting optical system, said light beam splitting optical system splitting the single parallel light beam emerging from said light beam illuminating system into a plurality of polarized light beams whose polarized states are different from each other;

a focusing optical system for focusing the plurality of split light beams to different positions near an end portion of the relatively moving object;

a polarizing prism for splitting reflected light beams from the relatively moving object on the basis of a difference between the plurality of directions of polarization;

a plurality of light receiving optical systems for individually detecting the different polarized light beams split by said polarizing prism and outputting light receiving signals of the respective light beams; and

a light receiving signal comparator for comparing light receiving signal levels of the respective light

beams to detect a relative displacement of the relatively moving object.

8. An apparatus according to claim 1 or 7, wherein said light beam splitting optical system is a crystal optical element.

9. An apparatus according to claim 1 or 7, wherein a boundary portion is formed on the surface of the relatively moving object to generate a reflectance difference.

10. A magnetic recording apparatus using said displacement detection apparatus of claim 4, comprising:

a head arm having the marking or reflectance boundary portion formed on an upper surface;

a rotary positioner having said displacement detection apparatus on a rotary arm; and

a head arm drive motor control unit for controlling a current of a head arm drive motor of a hard disk drive to synchronize a motion of said rotary positioner with a motion of said head arm so that an output from said displacement detection apparatus becomes constant as a position of said rotary positioner varies.

susan 11. A rotary encoder using said displacement detection apparatus of claim 4, comprising:

the slit-shaped marking or reflectance boundary portion formed on a rotary disk surface; and

said displacement detection apparatus on a fixed object side to receive the plurality of reflected light beams from the marking or reflectance boundary portion on a moving scale and detect a scale origin from a difference signal between the plurality of light receiving signals.

susan 12. A linear encoder using said displacement detection apparatus of claim 4, comprising:

the slit-shaped marking or reflectance boundary portion formed on linear encoder scale surface; and

said displacement detection apparatus on a moving object side to receive the plurality of reflected light beams from the marking or reflectance boundary portion on the linear encoder scale and detect a scale origin from a difference signal between the plurality of light receiving signals.

susan 13. A magnetic recording apparatus using said displacement detection apparatus of claim 9, comprising:

a head arm having the marking or reflectance boundary portion formed on an upper surface;

a rotary positioner having said displacement detection apparatus on a rotary arm; and

a head arm drive motor control unit for controlling a current of a head arm drive motor of a hard disk drive to synchronize a motion of said rotary positioner with a motion of said head arm so that an output from said displacement detection apparatus becomes constant as a position of said rotary positioner varies.

susan 14. A rotary encoder using said displacement detection apparatus of claim 9, comprising:

the slit-shaped marking or reflectance boundary portion formed on a rotary disk surface; and

said displacement detection apparatus on a fixed object side to receive the plurality of reflected light beams from the marking or reflectance boundary portion on a moving scale and detect a scale origin from a difference signal between the plurality of light receiving signals.

susan 15. A linear encoder using said displacement detection apparatus of claim 9, comprising:

the slit-shaped marking or reflectance boundary portion formed on linear encoder scale surface; and

said displacement detection apparatus on a moving object side to receive the plurality of reflected light

beams from the marking or reflectance boundary portion on the linear encoder scale and detect a scale origin from a difference signal between the plurality of light receiving signals.

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